

Composting Poultry Mortality

Alabama Guide Sheet No. AL 317



Definition

Composting poultry mortality is a process which biologically stabilizes the mortalities from a poultry operation, making them suitable for disposal by land application. It uses a simple mixture of dry poultry manure (litter), poultry carcasses, and a bulking agent or aeration medium such as wheat straw, peanut hulls, soybean hulls, etc. Only enough water is added to keep the material moist; the mixture should never be saturated. The following table provides a recommended recipe for composting poultry.

Proportions Of Materials Needed In Composting

Ingredients	Volumes	Weights
Poultry	1	1
Straw/Peanut Hulls*	0-1.2	0-0.4
Manure (Cake)**	4-8	2-4
Water***	0-0.6	0-1

* Composting can be accomplished without the bulking agent but the decomposition of birds may be less complete.

** Using a higher proportion of manure results in a better product.

***The mixture should be moist but not saturated. The amount of water needed depends upon the size of the birds and the moisture content of the litter.

Example: (Proportion by weight - 1:0.2 : 2.5:0.5)
 400 lbs. dead chickens (about 100 mature birds) = 1 part
 80 lbs. (4 cf) straw = 0.2 of 1 part
 1000 lbs. (33 cf) manure (litter) = 2.5 parts
 200 lbs. (25 gal.) water = 0.5 of 1 part

Operation and Maintenance

Loading the Primary Composter

Materials should be loaded into primary bins according to the following schedule:

1. Place 1-foot of dry manure on the floor of the bin. (This manure is not part of the recipe.)
2. Add a 6-inch layer of straw, peanut hulls, or other acceptable aeration medium (bulking agent).
3. Add a layer of carcasses. Do not mound the birds. Use a rake to spread the birds in a single layer. Keep birds at least 6 inches away from the walls.
4. Proper water content is important to success. Add water to each layer of carcasses as needed to ensure the mixture is damp. Water should be uniformly sprayed until the litter forms a moist ball when squeezed by hand, with no free water present.
5. Add manure to each layer. Several layers of bulking agent, birds, and manure may be needed during a single day when birds reach maturity or when mortality is higher than normal.
6. When the last layer of chickens is added to a bin, cap the pile with an extra layer of manure. The extra layer will insulate the pile and will also help prevent scavenging animals from digging into the top.

Monitoring Temperatures

After a primary bin is capped off, temperatures should be monitored daily. A 36-inch probe-type thermometer is ideal for this purpose.

Temperatures should reach 140°F to 160°F in 7 to 10 days after capping. In some cases, temperatures may exceed 170°F. If the temperature does not reach 140°F, try—

- adjusting the water content (see Loading the Primary Composter, Item 4.)
- using more of the bulking agent
- changing the bulking agent (do not use grasses or other material that will prevent aeration in the pile), and/or
- using no bulking agent. Temperatures should reach at least 140°F to kill fly larvae and kill most harmful bacteria and viruses. If temperatures exceed 190°F, remove the material from the composting bin (see Guide Sheet No. AL 313 - Preventing Fires in Litter Storage Structures).

Treatment in the Secondary Unit

Once the temperature peaks in the first stage and begins dropping, it is time to move the material to the second stage. Moving the material aerates the mixture and revives the bacteria, allowing them to begin another cycle of heating. Temperature should rise again and peak in about 7 days.

The original volume at the start of primary treatment will be reduced by 20 to 30 percent after completion of secondary composting.

Storing the Compost

The finished compost can remain in the second stage unit until it is ready to be applied to the land. The final product should be allowed to “rest” for about 30 days before spreading. If the secondary unit must be emptied prior to land application, the compost should remain covered. **COMPOST SHOULD NOT BE STORED WITH DRY MANURE!**

Single Stage Composting

Load the single stage composter the same as the primary bin of the two-stage process. A 20-inch probe-type thermometer should be used to monitor temperature daily to ensure temperatures reach 140°F.

See guidance under Monitoring Temperatures if the composter does not reach 140°F. Additional aeration with a hand tool may also be required. If compost is recycled, it must be mixed with at least one part litter per one part compost. Using recycled compost is not recommended because the resulting compost can become consolidated and have less air voids.

Another potential problem occurs when excessive amounts of water enter the composter through wind blown rain. If this occurs, the bins will need to be protected against rain.

After the temperature drops, which should occur in 7 to 10 days, the compost can be moved to storage. Otherwise, allow the compost to remain in the bin a **minimum** of one month after it has been capped before spreading onto the land.

Using “Hot Litter” for Composting

“Hot litter” refers to litter in which a high population of bacteria is maintained. Litter fresh from a poultry house typically contains billions of bacteria per pound of litter. In six weeks, this number can decline to hundreds per pound if the bacteria are not provided water and air. Using “hot litter” will result in faster, more complete composting.

A convenient way to keep fresh litter “hot” is to maintain a 6- to 10-day supply in a pile which is kept moist and turned on a daily basis. As a portion of the “hot litter” is removed to operate the primary bins, an equal volume of older litter is added to the “hot” pile, water is added, and the pile turned for mixing and aerating.

This method allows all the required water to be added to the “hot litter” pile, and will maintain a bacteria-rich litter supply with an initial temperature of 120°F. Proper loading of the primary cells will be easier, and the recipe will reach a higher temperature faster if “hot litter” is used.

Land Application of the Compost

The nutrient content of the finished compost can vary significantly from one facility to another. Factors that can affect nutrient content include age of the litter added, type of bulking agent (straw, peanut hulls, etc.), temperatures achieved during composting, etc. Therefore, each grower should have a sample of the compost analyzed for nitrogen, phosphorus, and potassium. NRCS can assist in the interpretation of lab data.

If lab data is not obtained, the following general guidelines may be used to estimate the available nutrient content of the compost:

Total Nitrogen (N): 43 lbs/ton
Phosphorus (P_2O_5): 58 lbs/ton
Potassium (K_2O): 45 lbs/ton

If lab data is used, assume that 30 percent of the nitrogen will be lost to the atmosphere after it is spread on the land. Compost should be applied according to agronomic rates for specific cropping systems as described in NRCS Conservation Practice Standard, Code 590 - Nutrient Management.

Since dead bird compost is relatively moist as compared to dry broiler litter, some adjustment may be needed to spreading equipment normally used for broiler litter. Straw used in the process may adversely affect some spreaders.

Maintaining the Composter

The compost structure should be inspected at least twice each year when the facility is empty. Replace any wooden parts or hardware as needed. Roofed structures should be examined for structural integrity.

Cautions

1. Composting dead poultry is not for everyone!
Although the owner will typically spend only

20 minutes per day in loading the bins for a 60,000-bird production facility, careful attention is needed to ensure these guidelines are followed. Failure to manage the system will result in an odorous operation that may attract flies, buzzards, and other vermin.

2. The composter is designed for normal mortality from the poultry facility. Although NRCS-designed composters have successfully accommodated above-average losses, the system is not designed for catastrophic losses resulting from excessive heat, collapse of buildings, loss from disease, etc.
3. Larger birds (6 pounds and above) may require extra care in composting. Water may need to be added during the process to maintain dampness, and a third stage of composting may be needed to produce an acceptable product.

References

NRCS AL Conservation Practice Standards
Code 590 - Nutrient Management
Code 317 - Composting Facility

NRCS Guide Sheet No.
AL 313 - Preventing Fires in Litter Storage Structures

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